



**METHODOLOGY FOR IMPROVING THE THERMAL
PERFORMANCE OF EXISTING SCHOOL BUILDINGS
USING VEGETATION ON BUILDING ENVELOPE
TECHNIQUES IN HOT ARID CLIMATE**

By

Shereen Mohamed Mahmoud Eweda

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
Architectural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Title of Thesis:

Methodology for Improving the Thermal Performance of Existing School Buildings Using Vegetation on Building Envelope Techniques in Hot Arid Climate

Key Words:

Thermal performance; School building; Classroom; Vegetated roof, Vegetated wall, vegetated envelope.

Summary:

The Thesis discusses the vegetation on the building envelope that can be used to improve the thermal performance of school buildings, especially within the classroom. The research discussed the concept of vegetated roofs and walls systems in general and the suitable plants to be used in Egypt, studied and analyzed the previous field of experiments and case studies that studied the same ideas and applications, and studied the international and local green rating systems for the use of plants on building envelopes, studied the school building design approaches and especially governmental schools in Egypt. Finally, through the experimental phase, the impact of installing vegetated roofs and walls systems using the Design Builder simulation program. The model of the school building is oriented to different orientations, by changing the type of plant, and the distance between it and the building. To achieve the highest efficiency of the thermal performance of the building and access to a methodology for improving the thermal performance, then conclusions and recommendations that showed the role of vegetating the building envelope in improving the highest efficiency of the thermal performance of the School buildings.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Shereen Mohamed Mahmoud Eweda

Date:

Signature:

Dedication

It is personally dedicated to my mother's soul Laila Moharram, who gave me her love, concern, and knowledge to complete my work. also, I dedicated to my father Mohamed Eweda who always encourages me, my husband Mostafa, my sister Nehad and my brother Ahmed. Also to my lovely two daughters.

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Table of Contents

DISCLAIMER	I
DEDICATION	II
ACKNOWLEDGMENTS	III
TABLE OF CONTENTS	IV
LIST OF TABLES	VII
LIST OF FIGURES	VIII
ABSTRACT	XV
CHAPTER 1 INTRODUCTION TO IMPROVING THERMAL PERFORMANCE OF BUILDINGS	
1	
1.1. INTRODUCTION.....	1
1.2. PROBLEM STATEMENT	2
1.3. RESEARCH OBJECTIVES	2
1.4. HYPOTHESIS	3
1.5. RESEARCH METHODOLOGY.....	3
1.5.1. Deductive Approach.....	3
1.5.1.1. Literature Review	3
1.5.1.2. Integrated framework Development	4
1.5.2. Analytical Approach	4
1.5.3. Experimental phase	4
1.5.4. Inductive Approach.....	4
1.6. RESEARCH DELIMITATIONS.....	6
1.6.1. Research Organization	6
CHAPTER 2 :THERMAL PERFORMANCE AND SCHOOL BUILDINGS.....	
8	
2.1. INTRODUCTION.....	8
2.1.1. Introduction to school building envelope.....	8
2.1.2. Factors affecting thermal performance of School Buildings.....	8
2.1.3. Measuring tools for building envelope.....	9
2.2. INTEGRATION BETWEEN LANDSCAPE AND ARCHITECTURE	9
2.3. ENVIRONMENTAL PROBLEMS AND SUSTAINABILITY	9
2.3.1. Urban Heat Island Effect.....	9
2.3.2. Sustainability.....	10
2.3.3. Leaf Area Index (LAI)	11
2.4. THE PRECEDENTS IN VEGETATING THE BUILDING ENVELOPE.....	11
2.4.1. Evolution of Vegetated Roof Systems	12
2.4.1.1. Economic benefits	13
2.4.1.2. Amenity and aesthetic benefits	13
2.4.1.3. Environmental benefits	13
2.4.1.4. Types of Vegetated (green) Roofs	14
2.4.1.5. Basic Design Parameters	19